

Again, many field operations consist of just two functions: working depth and shallow depth (end of field turning). In the (2) position 26, these two functions are slaved and always sequence each other. For full raise, move Toggle switch 23 to the (0) position 24.

Programming Software Points

1. Rocker switch will change readout, upon second activation as rapidly as switch is activated
2. When lowering implement, energize solenoid valve 2/10 inch before actual set point (adjustment for oil compression). This setting is programmable.
3. When raising implement, energize solenoid valve at actual set point
4. The LED readout holds a +/- 1/10 inch span; that is, a depth point of "03.0" can be "02.9" or "03.1". This setting is programmable.
5. If implement hydraulics drift beyond the +/- span LCD will follow a decreasing or increasing set point and blink every second to show
6. If drift is a result of draft forces, the LCD will discontinue blinking upon LCD returning to the +/- set point
7. If LED continuously returns to set point three times while Console is "ON", software will show variation only every two seconds.
8. The software ignores the shallow depth when the Toggle switch is in position 26 and the LED readout is increasing

The foregoing description of the exemplary embodiment of the invention has been presented for the purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise form disclosed. Many modifications and variations are possible in light of the above teaching. It is intended that the scope of the invention be limited not with this detailed description but rather by the claims appended hereto:

What is claimed is:

1. A manual electro-hydraulic selective depth control system for establishing a set position of a device above the ground as the device is moved across a surface, the selective depth control system comprising:

a toggle input device for specifying a plurality of position settings;

a device position sensor for determining a measured device position; and

a hydraulic position control system having a programmable ground zero position and a programmable maximum depth position for the device, the hydraulic position control system maintains the current position corresponding to the measured device position within a specified position within a specified position window around a set position programmed relative to the ground-zero and maximum-depth position;

wherein the toggle input device comprises:

a working position that places the set position at a programmed position;

a shallow position that places the set position at a minimum deployed depth;

a zero position that places the remote solenoid in a permanent de-energized mode

2. The manual electro-hydraulic selective depth control system according to claim 1 wherein the toggle input device further comprises a window size control input for specifying a size for the position window used by the hydraulic control system.

3. The manual electro-hydraulic selective depth control system according to claim 1, wherein the device position sensor is a potentiometer-based system.

4. The manual electro-hydraulic selective depth control system according to claim 1, wherein the device position sensor is an ultra-sonic transducer-based system.

5. The manual electro-hydraulic selective depth control system according to claim 1, wherein the toggle input device further comprises:

a set switch for setting the programmed position used when the toggle is in its current position to a new position of the device; and

a up/down rocker switch for adjusting the current position of the device.

6. The manual electro-hydraulic selective depth control system according to claim 5, wherein the shallow deployed depth corresponds to a programmable position having a default position 1.5 inches deeper than the ground-zero position.

7. The manual electro-hydraulic selective depth control system according to claim 5, wherein the function of shallow position is slaved to the function of the working position in that a manual raise function of the hydraulic power source will move the set position from the programmed working position automatically to the set position of the shallow position.

8. The manual electro-hydraulic selective depth control system according to claim 5, wherein the programmed working position corresponds to a programmable position having a default position 3.0 inches deeper than the ground-zero position.

9. The manual electro-hydraulic selective depth control system according to claim 1, wherein the manual electro-hydraulic selective depth control system further comprises a device position display unit comprising a numeric LED display element.

10. The manual electro-hydraulic selective depth control system according to claim 9, wherein the numeric LED display element shows depth in inches with a decimal point to show 1/10 of an inch.

11. The manual electro-hydraulic selective depth control system according to claim 1, wherein the hydraulic control system further comprises a remote two-way, two position, normally open solenoid valve.

12. A manual electro-hydraulic selective depth control system for establishing a set position of a device above the ground as the device is moved across a surface, the selective depth control system comprising:

a processor based unit; and

a remote control unit; and,

a three position toggle input device.

13. The manual electro-hydraulic selective depth control system according to claim 12, wherein the function of shallow position is not slaved to the function of the working position thereby having its own programmable depth, and in that a manual raise function of the hydraulic power source will move the set position from the shallow position to a full raise position.

14. The manual electro-hydraulic selective depth control system according to claim 12, wherein the function of the working position is slaved to the function of the shallow position in that a manual raise function of the hydraulic power source will move the set position from the shallow programmed position automatically to the set position of the working position.

15. The manual electro-hydraulic selective depth control system according to claim 12, wherein the function of the working position and the shallow position are not slaved and a manual raise function of the hydraulic power source will move the set position from the working position and shallow position to a full raise position.

16. A manual electro-hydraulic selective depth control system for establishing a set position of a device above the ground as the device is moved across a surface, the selective depth control system comprising:

an input device for specifying a plurality of position settings;

a device position sensor;

a processor control unit;

a console control unit;

a device position display unit; and

one or more hydraulic manifolds having a solenoid valve.

17. The manual electro-hydraulic selective depth control system according to claim 16, wherein a hydraulic manifold includes a Rebound Valve having a plurality of hydraulic connections, the rebound valve comprising a counter-balance valve coupled to a first solenoid activated valve, and a pressure reducing and relieving valve and a check valve; wherein,

the counter balance valve is configured to prevent air ingestion, to act as a check valve for cylinder retraction, and to act as a relief valve against over pressurization at the master cylinder; and

the pressure reducing and relieving valve is configured to provide an adjustable and controlled pressure in the rod side of the outer slave circuit to protect against effects of compression and decompression, to provide for ingest and exhaust of hydraulic oil in order to meet hydraulic fluid requirements caused by draft and draft relief forces, and to restrict the exhaust of hydraulic oil to dampen cylinder movement; and

the check valve is configured to operate in conjunction with the pressure reducing and relieving valve to stabilize the positions of the hydraulic cylinders by keeping the cylinders under pressure.

18. The manual electro-hydraulic selective depth control system according to claim 16 wherein a hydraulic manifold includes a counter-balance valve coupled to a first solenoid activated valve and a check valve;

wherein,

the counter-balance valve is configured to prevent air ingestion, to act as a check valve for cylinder retraction, and to act as a relief valve against over pressurization at the master cylinder; and

the check valve is configured to operated in conjunction with the counter-balance valve by keeping the cylinders under pressure.

19. The manual electro-hydraulic selective depth control system according to claim 16 wherein a hydraulic manifold includes a counter-balance valve coupled to a first solenoid activated valve;

wherein,

the counter-balance valve is configured to prevent air ingestion, to act as a check valve for cylinder retraction, and to act as a relief valve against over pressurization at the master cylinder.

20. The manual electro-hydraulic selective depth control system according to claim 16, wherein the hydraulic position control system comprise a parallel series cylinder set.

21. The manual electro-hydraulic selective depth control system according to claim 16, wherein the hydraulic position control system comprise a series cylinder set.

22. The manual electro-hydraulic selective depth control system according to claim 16, wherein the hydraulic position control system comprises a single cylinder.